April 30, 2003

Mr. G. R. Peterson
Vice President, Catawba Site
Duke Energy Corporation
4800 Concord Road
York, SC 29710

SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2 RE: REQUEST FOR ADDITIONAL INFORMATION (TAC NOS. MB7842 AND MB7843)

Dear Mr. Peterson:

By letter dated February 25, 2003, you submitted an application for amendment of the Technical Specifications (TS) for the Catawba Nuclear Station, Units 1 and 2, to change the requirements for inspection of the steam generators. Our letter dated March 24, 2003, documented the discussions that we had with your staff on March 20, 2003, and we met with your staff on these issues on March 27, 2003.

The U. S. Nuclear Regulatory Commission technical staff has reviewed the application and has considered the information provided in the meeting of March 27, 2003, and has determined that additional information is required. Your application for amendment is still undergoing legal review. Our questions regarding the structural integrity performance criteria are provided in Enclosure 1. Enclosure 2 contains our questions and comments pertaining to the TS and Bases. Enclosure 3 contains the changes to the TS Bases that we have determined are necessary. Enclosure 4 provides our comments containing to TS Section 5.5.9.

We discussed these issues with your staff on April 29, 2003. Your staff indicated that you would attempt to provide your response by June 1, 2003.

Please contact me at (301) 415-1419, if you have any other questions on these issues.

Sincerely,

/RA/

Leonard N. Olshan, Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-413 and 50-414

Enclosures: As stated

cc w/encl: See next

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Catawba Nuclear Station

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Catawba Nuclear Station

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REQUEST FOR ADDITIONAL INFORMATION
CATAWBA UNITS 1 AND 2
TECHNICAL SPECIFICATION AMENDMENT - STEAM GENERATORS
STRUCTURAL INTEGRITY PERFORMANCE CRITERIA

References:

1. Nuclear Energy Institute (NEI) Letter to NRC dated November 14, 2002, "Steam Generator Structural Integrity Performance Criterion Accident Loading Safety Factor," enclosing "White Paper on Deterministic Structural Integrity Performance Criterion Definition."

2. Duke Energy Letter to NRC dated February 25, 2003, requesting amendment to Catawba Unit 1 and 2 technical specifications regarding steam generators. Accession Number ML030690029.

Background

Section 2.1 of the White Paper enclosed with Reference 1 defines a proposed revision to the steam generator structural integrity performance criterion as provided in NEI 97-06, Revision 1. This revised performance criteria has been incorporated as part of a proposed amendment of the technical specifications for Catawba Units 1 and 2 submitted by Duke Energy Corporation in Reference 2.

Requested Information

1. The proposed revision to the structural integrity performance criteria would limit application of the safety factors of 3.0 and 1.4 to primary to secondary pressure differentials associated with normal steady state full power operation and with Level D service, respectively. Provide technical justification for not applying these safety factors to other sources of primary membrane stress and primary bending stress. This technical justification needs to address the consistency of this proposal with safety factors invoked in Section XI of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code flaw analyses for primary membrane and primary bending stress for other components and justify differences. In addition, this technical justification needs to specifically address the safety factors used in Section XI of the Code for evaluation of flaws in austenitic piping, and discuss why these safety factors, which presumably apply to non-pressure related sources as well as pressure related sources of primary membrane stress and to primary bending stress, are not appropriate for application to steam generator tubes. (Note, the safety factors in Appendix C of Section XI applicable to primary membrane plus bending stress are 2.77 for normal operating conditions and half that for emergency and faulted conditions. The 2.77 safety factor represents an average of a factor of 3.0 derived from Section III of the Code for primary membrane stress and a factor of 2.55 derived from Section III for primary bending stress. (Reference: EPRI NP-4690-SR, "Evaluation of Flaws in Austenitic Steel Piping")

2. The proposed revision of the structural integrity performance criteria makes the 1.4 safety factor applicable to ASME, Section III Level D loads rather than to "limiting design basis accidents." What design basis accidents could potentially, depending on the plant, not be included among the Level D loads? Provide justification for not including, as part of the proposed change, the appropriate safety factor to be applied to ASME Section III, Level C loads or, alternatively, for not taking the approach described in Section XI, Appendix C of the Code for austenitic piping which is to apply a single safety factor for Level C and Level D loads.

3. The intent of the last sentence of the proposed criterion is unclear. Clarify specifically what is meant by the words "appropriate load due to the defined pressure differential." (This appears to be an attempt to capture the intent of the words in the second paragraph of Section 5.3.1 of the White Paper but, in the staff's opinion, doesn't actually do so.) Also, the sentence appears incomplete since it says to combine loads but does not say for what purpose.

4. Provide the technical basis for the proposed safety factor of 1.0 to be applied to non-pressure related primary membrane stress and primary bending stress and cite examples where such safety factors are allowed for other ASME Class 1 components in the ASME Code, other specifications, or in NRC regulatory requirements. Does the proposed safety factor of 1.0 mean that it is acceptable for steam generator tubes to be at the point of incipient plastic collapse or burst? If not, why not and how much actual safety margin is there to burst? (If the response to this question relies on the safety factors being applied to the pressure loads, the response should also address situations where the non-pressure related primary membrane stress and/or primary bending stress may reach their maximum values at a time when the pressure loadings are relatively low.)

5. Provide details of the technical basis for the proposed safety factor of 1.0 to be applied to differential thermal loads (the White Paper simply notes that this safety factor is consistent with what has traditionally been used for once through steam generators and is consistent with the Flaw Handbook). The White Paper cites two examples in the Code where thermal stresses are subject to safety factor of 1.0. The staff notes, however, that for certain accidents and transients in once through steam generators (OTSGs), axial thermal stress is dominant axial stress in the tube. Provide assessment of whether there are implicit assumptions made in the development of the two cited examples regarding the relative magnitude of thermal stress compared to other stresses that exists for these examples and whether these assumptions will necessarily be valid for steam generator tubes, particularly those for OTSGs. Does the proposed safety factor of 1.0 mean that it is acceptable for steam generator tubes to be at the point of incipient plastic collapse or burst? If not, why not and how much actual safety margin is there to burst? (If the response to this question relies on the safety factors being applied to the pressure loads, the response should also address situations where the thermal loads may reach their maximum values at a time when the pressure loadings are relatively low.)

6. Discuss whether there need to be stipulations to the use of the proposed safety factor of 1.0 such that it is appropriate for use; e.g., stipulations on the method of analyses used to determine the thermal loads such as the use of elastic analysis. Discuss whether there are circumstances, types of analysis methods, or tests for which different safety factors may be appropriate.

REQUEST FOR ADDITIONAL INFORMATION
CATAWBA UNITS 1 AND 2
TECHNICAL SPECIFICATION AMENDMENT - STEAM GENERATORS

B 3.4.13 RCS Operational Leakage (BASES)

1. The licensee proposes to delete a sentence which reads:

> "The volumetric calculation of primary to secondary LEAKAGE is based on a density at operating RCS temperature of 585 degrees F."

The licensee proposes to add the following statement (Insert B):

> "The primary to secondary LEAKAGE measurement is based on the methodology described in Ref. 5. Currently, a correction factor is applied to account for the fact that current safety analyses take the primary to secondary leak rate at reactor coolant conditions, rather than at room temperature as described in Ref. 5."

The licensee also proposes to add the following statement (Insert D).

> "The 150 gallons per day limit is based on room temperature measurements."

The statement in Insert D appears to contradict the statement in Insert B. The licensee needs to resolve this discrepancy. Why should the 150 gallon per day limit not be based on reactor coolant conditions assumed in the current safety analyses?

2. The first sentence of Insert B needs to be clarified as follows:

> The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, "Steam Generator Program Guidelines" (Ref. 6). The Steam Generator Program operational leakage performance criterion in NEI 97-06 states: "The RCS operational primary to secondary LEAKAGE through any one SG shall be limited to 150 gallons per day."

3. The second sentence of paragraph 4 of Insert B oversells the case based on operating experience and needs to be revised. The staff believes the following to be a more defensible position:

> "The operational leakage rate criterion in conjunction with implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures."

4. Insert D for SR 3.4.13.2 Bases states that "If this SR is not met, compliance with LCO 3.4.18 should be evaluated." This statement should be in the form of a Note to SR 3.4.13.2.

3.4.18 Steam Generator (SG) Tube Integrity

1. The proposed LCO, Actions - Condition A, SR 3.4.18. 2, and B 3.4.18 create confusion by referring to plugging tubes which satisfy the tube repair criteria. This is contrary to conventional usage whereby satisfying an acceptance limit implies an acceptable condition and needs to be revised. One acceptable approach is to replace the word "satisfying" with the words "failing to satisfy." Another acceptable approach is to refer to "tubes with flaws that exceed the tube repair criteria."

2. The words "or repaired" needs to be deleted from the LCO, Actions - Condition A, and SR 3.4.18. 2

3. Required Action A.1 uses words similar to SR 3.4.18.1 thereby creating confusion. The BASES makes it clear that "verify" in SR 3.4.18.1 refers to condition monitoring to be performed during an inspection to confirm that tube integrity existed up to that time. In contrast, "verify" in A.1 refers to a forward looking analytical assessment to verify that tube integrity will be maintained until the next inspection. Action A.1 needs to be clarified to as follows.

"Perform assessment to verify tube integrity of the affected tube(s) will be maintained."

4. An NRC notification requirement needs to be added if the licensee fails to plug a tube which fails to satisfy the applicable repair criteria.

B 3.4.18 Steam Generator Tube Integrity (BASES)

1. With respect to the BACKGROUND section of B3.4.18, clarifications are needed as indicated in the attached markup.

2. With respect to the APPLICABLE SAFETY ANALYSES section of B 3.4.18;

a. Is feed line break a design basis accident for Catawba Units 1 and 2? If so, it needs to be included in the list of design basis accidents in the third paragraph of this section.

b. The eighth paragraph in the Applicable Safety Analyses Bases states that "the three SG performance criteria and the limits included in the plant Technical Specifications for Dose Equivalent I^{131} in primary coolant and secondary coolant ensure that plant is operated within its analyzed condition." The specific TS needs to be listed to be consistent with the rest of the Bases instead of the generic statement.

c. The paragraph continues with the statement that "the dose consequences resulting from the most limiting design basis accident are within the limits defined in GDC 19, 10 CFR 100 or the NRC approved licensing basis." This is a very generic statement and it is not clear which limit (GDC 19, 10 CFR 100, or NRC approved licensing basis) is met for Catawba. This needs to be clarified. This comment also applies to the first paragraph under the heading "Design Basis" on page B 3.4.18-7

3. With respect to the LCO section of B 3.4.18;

    a. The first 4 paragraphs of this section are intended, in part, to summarize those actions necessary to ensure compliance with the LCO for SG tube integrity. These paragraphs need to be clarified as indicated in the attached markup to distinguish those actions specifically cited by Specification 5.5.9, "Steam Generator Program," versus those that are not specifically spelled out in the specification but which the licensee is performing as part of the SG program consistent with industry guidance.

    b. There is a subheading within this section (on page B 3.4.18-6) entitled "Tube Structural Integrity." This sub-heading needs to be revised since burst integrity is discussed earlier in the section. "No Yield Criterion" or "Yield Strength Considerations" are more appropriate headings.

    c. At the bottom of page B 3.4.18-8, there is a paragraph which reads:

        > "The Bases for SR 3.4.13.2 indicates that if this SR is not met, compliance with LCO 3.4.18 should be evaluated. If SR 3.4.13.2 is met, then compliance with LCO 3.4.18 need not be evaluated insofar as primary to secondary LEAKAGE is concerned.

        The second sentence needs to be clarified to refer to primary to secondary <u>operational</u> LEAKAGE.

        A third sentence needs to be added to the paragraph to emphasize the point that the integrity of tubes found to be leaking during SG tube inspections need to be evaluated as part of condition monitoring against the tube structural integrity and accident leakage performance criteria in accordance with the SG program, even if the operational leakage criterion was satisfied immediately prior to plant shutdown.

4. With respect to the ACTIONS section of B 3.4.18;

    a. Confusion is created by referring to plugging tubes which satisfy the tube repair criteria. This is contrary to conventional usage whereby satisfying an acceptance limit implies an acceptable condition and needs to be revised. One acceptable approach is to replace the word "satisfying" with the words "failing to satisfy." Another acceptable approach is to refer to "tubes with flaws that exceed the tube repair criteria."

    b. The words "or repaired" appear here and in other sections of B 3.4.18. These words need to be deleted consistent with staff comments that words relating to tube repairs should be deleted from Specifications 3.4.18 and 5.5.9.

    c. The last sentence of second paragraph under sub-heading "A.1 and A.2" states that "the tube integrity determination is based on the estimated condition of the tube at the time the situation is discovered." This statement is incomplete. The following words need to be added to the end of the sentence: "and estimated growth of the degradation prior to the next SG inspection."

5. With respect to the SURVEILLANCE REQUIREMENTS section of B 3.4.18;

   a. The first paragraph needs tobe clarified as indicated in the attached markup to distinguish those actions specifically cited by Specification 5.5.9, “Steam Generator Program,” versus those that are not specifically spelled out in the specification but which the licensee is performing as part of the SG program consistent with industry guidance.

   b. This section of B 3.4.18 states: “The Steam Generator Program determines the scope of the inspection and the methods used to determine compliance with the performance criteria.” This sentence misses the point that the inspection scope and methods are used to determine whether the tubes contain flaws exceeding the tube repair criteria. This sentence needs to be revised as follows:

      > “In accordance with specification 5.5.9, the inspection scope (i.e., number and portions of the tubes inspected) and method of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet and the tube-to-tubesheet weld at the tube outlet, and that may exceed the applicable tube repair criteria. In addition, the scope, method, and frequency of inspection are such as to ensure that steam generator tube integrity is maintained.”

   c. This section of B 3.4.18 states: “Inspection scope is a function of existing and potential degradation locations and safety/pressure boundary considerations.” The words “and safety/pressure boundary considerations” need to be deleted from this sentence. A key objective of tube inspections is to find flaws which may exceed the tube repair limit where ever such flaws may exist along the tube length and whatever their safety implications. Staff comments made elsewhere in this RAI are intended to ensure that Specification 5.5.9 is clear on this point. The staff believes that the entire length of tubing between the welds is part of the design basis pressure boundary. If the licensee believes that certain flaws in certain regions of the tubing have no safety implications even if they exceed the plugging limit, the staff believes that a technical specification amendment is necessary if such flaws are not to be addressed by the inspection scope and/or methods.

   d. The last two paragraphs under the heading “SR 3.4.18.1 need to be clarified as indicated in the attached markup to better distinguish those actions specifically cited by Specification 5.5.9, “Steam Generator Program,” versus those that are not specifically spelled out in the specification but which the licensee is performing as part of the SG program consistent with industry guidance.

   e. The third paragraph under the heading “SR 3.4.18.2" incorrectly states that the tube repair criteria assures that tubes left in service will meet the performance criteria at the next scheduled inspection irrespective of the other elements of the SG Program including the SG inspection interval. This paragraph needs to be revised in a manner similar to the attached markup to make it clear that the tube repair criteria in conjunction with other elements of the SG program assures that

tubes left in service will meet the performance criteria at the next scheduled inspection.

f. The second to last paragraph on page B 3.4.18-12 and the second full paragraph on page B 3.4.18-13 both address the topic of the significance of failing to detect a flaw which fails to meet the tube repair limit. The first of these paragraphs does not provide an insightful discussion of the topic and needs to be deleted or a more insightful discussion provided. The staff has no objection to the second of these paragraphs.

Specification 5.5.9, Steam Generator (SG) Program (Version dated April 25, 2003)

1. The first sentence of the first paragraph requires that an SG program be established and implemented to ensure SG tube integrity is maintained. The second sentence of the first paragraph states that the SG program shall address the following topics (provisions): a., b., c..... The staff believes that this sentence can misconstrued to mean that implementation of the listed provisions is sufficient to ensure that SG tube integrity is maintained and, thus, the listed provisions are sufficient to constitute an acceptable SG Program. The specification needs to be clarified to ensure that it is not misconstrued in this manner. To this end, the second sentence of the first paragraph needs to be replaced with the following: “In addition, the SG program shall include the following provisions.”

2. Paragraph d of the proposed specification is inappropriate for two reasons and needs to be deleted. First, it creates a potential compliance issue with respect to second sentence of the opening paragraph of the specification. This second sentence requires, in part, that the SG Program address provisions for repair methods. However, there are currently no repair methods approved for the Catawba steam generators. Thus, there are currently no provisions for repair methods.

Second, paragraph d would permit the use of repair methods approved by NRC. The paragraph is unclear with respect to whether the approval would need to be specific to Catawba or whether repair methods could be implemented that have been approved for another plant or which have been approved generically. In any case, paragraph d reintroduces a problem that previously existed with the NEI Generic License Change Package and which was the subject of an NRC letter to NEI dated June 11, 2002. That letter concluded that approved tube repair methods should be identified in the technical specifications based on existing regulations and Agency policy, including the Commission’s Perry decision in 1996.

3. Paragraph e of the proposed specification states: “The scope of inspection and method of inspection shall ensure the detection of flaws not meeting the performance criteria that are present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet and the tube-to-tubesheet weld at the tube outlet.” The words “scope of inspection” need to be clarified in parentheses as referring to the number and portions of tubes to be inspected. In addition, the words “shall ensure the detection of flaws not meeting the performance criteria” are not consistent with the keystone objective of the SG Program which is to ensure that tube integrity is maintained during Mode 1 through 4 operation. If one only has the ability to detect tubes not meeting the performance criteria, there is no assurance that one can detect flaws in sufficient time to ensure that the performance criteria will be met at the time of the next scheduled inspection.

Paragraph e of the proposed specification also states: “Inspection intervals shall be based on integrity evaluations from the previous SG inspection and shall not exceed the intervals described below.” The intent of the words “integrity evaluations from the previous SG inspection” is vague. These words do not directly relate inspection interval to the need to ensure that that tube integrity is maintained.

In addition, paragraph e states: “SG inspection intervals shall be as follows:” This sentence is inconsistent with the earlier sentence unless it is modified to indicate that these are additional requirements.

The staff believes that paragraph e. needs to be revised as follows:

e. “Periodic steam generator tube inspections shall be performed. The inspection scope (i.e., number and portions of the tubes inspected) and method of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet and the tube-to-tubesheet weld at the tube outlet, and that may exceed the applicable tube repair criteria. (The tube-to-tube sheet weld is not part of the tube.) In addition to meeting requirements e.1, e.2, and e.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that steam generator tube integrity is maintained until the next SG inspection.”

4. The words “by bobbin coil eddy current technique” in sub-paragraph e.1 needs to be deleted. The staff doesn’t wish to endorse the bobbin coil inspection method as being sufficient during the first inservice inspection. It would be the licensee’s responsibility, as it is now, to perform a degradation assessment prior to the inspection in accordance with NEI 97-06 to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine what inspection methods need to be employed and at what locations.

5. The April 25 version of the licensee’s proposed specification adds additional words to sub-paragraph e.2 and e.3 as follows: “However, during the first inspection period, examination of regions susceptible to stress corrosion cracking (e.g., expansion transitions, nonstress-relieved low-row U-bends, dents, dings) may be limited to 20% of the tubes in each SG at the refueling outage nearest the midpoint of the period and an additional 20% at the refueling outage nearest the end of the period.” The staff notes that these proposed additional words could be interpreted to mean that inspection intervals for locations subject to stress corrosion cracking could exceed the 48 EFPM/2 fuel cycle limitation for Alloy 600 TT tubing and the 72 EFPM/3 fuel cycle limitation for Alloy 690 TT tubing. For example, the additional wording implies that an inspection interval of 54 EFPM is acceptable for stress corrosion cracks for plants with Alloy 600 TT tubing and operating with 18 EFPM fuel cycles. The proposed additional words need to be deleted.

The parenthetical expression “(whichever is sooner)” needs to be added to the last sentence of e.2 and e.3 and to the first sentence of e.4.

7. The Bases of TS 3.4.4, 3.4.5, and 3.4.6, describes an Operable RCS loop as having ‘an operable RCP and an operable SG in accordance with the Steam Generator Program.’ The

Bases of TS 3.4.7 states that 'an operable SG can perform as a heat sink when it has an adequate water level and is Operable in accordance with the Steam Generator Program.' The proposed Steam Generator Program does not describe what an Operable SG is (i.e., there is no statement that says that an operable SG is .....). The Steam Generator Program needs to state what is an OPERABLE SG.

8. The proposed SR 3.4.13.2 requires that verification that primary to secondary leakage is less than or equal to 150 gallons per day through any one steam generator. This verification is to be performed at a frequency "in accordance with the SG Program." The staff acknowledges that the proposed B 3.4.13 state that leakage will be monitored in accordance with industry guidelines for the SG Program which include detailed guidelines for monitoring primary to secondary leakage. However, proposed specification 5.5.9, "Steam Generator Program" makes no specific mention of verifying that operation primary to secondary leakage meets the specified limit. To ensure the proposed specification meets the intent of 10 CFR 50.36, the following additional provision needs to be included in 5.5.9.

The attached sample specification 5.5.9 illustrates a revised version of the specification submitted by the licensee on April 25, 2003 which addresses the staff's comments above.

<u>Specification 5.6.8, "Steam Generator Tube Inspection Report</u>

References to repair methods and repairs need to be deleted.

TS 5.5.9, Steam Generator (SG) Program:

A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. The steam generators are OPERABLE when steam generator tube integrity is maintained. In addition, the Steam Generator Program shall include the following provisions:

a. Provisions for condition monitoring assessments. Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural and accident induced leakage integrity. The "as found" condition refers to the condition of the tubing during a SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging or repair of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected, plugged, or repaired to confirm that the performance criteria are being met.

b. Performance Criteria for SG tube integrity. SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage, and operational LEAKAGE.

    1. Structural integrity performance criterion: **Comments will be resolved by a different group**

    2. Accident induced leakage performance criterion: The primary to secondary accident induced leakage rate for any design basis accident, other than a SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is not to exceed 150 gallons per day through each SG for a total of 600 gallons per day through all SGs.

    3. The operational LEAKAGE performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."

c. Provisions for SG tube repair criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged or repaired.

d. Provisions for SG tube inspections. Periodic steam generator tube inspections shall be performed. The inspection scope (i.e., number and portions of the tubes inspected) and method of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet and the tube-to-tubesheet weld at the tube outlet, and that may exceed the applicable tube repair criteria. (The tube-to-tube sheet weld is not part of the tube.) In addition to meeting requirements e.1, e.2, e.3, and e.4 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that steam generator tube integrity is maintained until the next SG inspection.

1. 100% of the tubes in each SG during the first refueling outage following SG replacement.

2. For Unit 1, inspect 100% of tubes at sequential periods of 144, 108 72, and, thereafter, 60 effective full power months (EFPM). The first sequential period shall be considered to begin after the first inservice inspection of the SG's. In addition, inspect 50% of the tubes by the refueling outage nearest the mid point of the period and the remaining 50% by the refueling outage near the end of the period. No SG can operate for more than 72 EFPM or three refueling outages (whichever is sooner) without being inspected.

3. For Unit 2, inspect 100% of tubes at sequential periods of 120, 90, and, thereafter, 60 EFPM. The first sequential period shall be considered to begin after the first inservice inspection of the SG's. In addition, inspect 50% of the tubes by the refueling outage nearest the mid point of the period and the remaining 50% by the refueling outage near the end of the period. No SG can operate for more than 48 EFPM or two refueling outages (whichever is sooner) without being inspected.

4. If crack indications are found in any SG tube, then the next inspection for each SG for the degradation mechanism that caused the crack indication shall not exceed 24 EFPM or one refueling outage (whichever is sooner). If definitive information, such as from examination of a pulled tube, diagnostic non–destructive testing or engineering evaluation indicates that a crack like indication is not associated with crack(s), then the indication need not be treated as a crack.

e. Provisions for monitoring operational primary to secondary leakage.